



UNITED STATES PATENT AND TRADEMARK OFFICE

mn
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/600,419

06/20/2003

Hongxin Song

MP0275

6709

26200 7590 06/20/2007
FISH & RICHARDSON P.C.
P.O BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

RIZK, SAMIR WADIE

ART UNIT

PAPER NUMBER

2112

MAIL DATE

DELIVERY MODE

06/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/600,419

Applicant(s)

SONG ET AL.

Examiner

Sam Rizk

Art Unit

2112

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27, 29-49 and 51-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27, 29-49, 51-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

- Response to the applicant's amendment dated 4/9/2007
- Claims 28,50 and 70 have been Cancelled
- Added new claims 76-78
- Claims 1-27,29-49 and 51-78 have been submitted for examination
- Claims 1-27,29-49 and 51-78 have been rejected

Claim Rejections - 35 USC § 101

1. In view of the applicant's amended claims 22 and 64, all rejections to the claims 22,23,64 and 65 under section 35 USC § 101 are withdrawn.

Response to Arguments

2. Applicant's arguments with respect to claims, 1,12,22,34,45,53 and 64 have been considered but are moot in view of the new ground(s) of rejection in view of Rothberg US Patent no. 7136244 (Hereinafter Rothberg).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 9-12, 17-24,26,30-35,43-46,52,54,61-66,68 and 72-78 are rejected under 35 U.S.C. 102(e) as being anticipated by Rothberg.

4. In regard to claim 1, Rothberg teaches:

(currently amended) A signal processing apparatus comprising:

- an input to receive a signal;

(Note: FIG. 1B reference character (14) in Rothberg)

- a buffer responsive to the input to store the signal;

(Note: FIG. 1B reference character (16) in Rothberg)

- a detector responsive to the input to interpret the signal as discrete values;

(Note: FIG. 2, reference character (24) in Rothberg)

- an averaging circuit responsive to the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average of a previous signal stored in the buffer and a current signal; and

(Note: FIG. 1B reference character (20) in Rothberg)

- a control circuit that determines whether the discrete values are adequately indicated based on output of the detector, that initiates the retry mode when the discrete values are not adequately indicated, and that determines whether the discrete values are adequately indicated from the interpretation of the new signal in the retry mode.

(Note: FIG. 1B, reference character (18) and FIG. 8, reference characters (68) and (72) and col. 8, lines (55-65) in Rothberg)

5. In regard to claim 2, Rothberg teaches:

Art Unit: 2112

(previously presented) The apparatus of claim 1, wherein the signal from the input comprises a read signal received from a storage medium.

(Note: FIG. 1B, reference character (10) in Rothberg)

6. In regard to claim 9, Rothberg teaches;

(currently amended) The apparatus of claim 1, wherein the control circuit determines whether the discrete values are adequately indicated based on comparison of interpretations of the new averaged signal and the current signal.

(Note: FIG. 1B, reference characters (20) & (22) in Rothberg)

7. In regard to claim 10, Rothberg teaches;

(currently amended) The apparatus of claim 1, wherein the control circuit causes averaging of a defined number of most recent input signals, wherein the defined number is greater than two.

(Note: FIG. 2, reference characters (32o – 32n) in Rothberg)

8. In regard to claim 11, Rothberg teaches:

(currently amended) The apparatus of claim 1, wherein the control circuit causes the previous signal stored in the buffer to be an averaged input signal when two or more signals are obtained in the retry mode.

(Note: FIG. 2, reference characters (32o – 32n) in Rothberg)

9. Claims 12 and 53 are rejected for the same reasons as per claim 1.

10. Claims 19, 26, 30, 43, 52, 61, 68 and 72 are rejected for the same reasons as per claim 9.

Art Unit: 2112

11. Claims 20, 31, 62, 73, 76, 75 and 78 are rejected for the same reasons as per claim 10.

12. Claims 21, 24, 32, 33, 44, 63, 66, 74 and 77 are rejected for the same reasons as per claim 11.

13. in regard to claim 22, Rothberg teaches;

(currently amended) A method of reading data on a channel or media, the method comprising;

- interpreting an input signal as discrete values; and
- deciding whether the discrete values have been adequately interpreted from the input entering a retry mode in response to a decision that the discrete values have not been adequately interpreted from the input signal; and an inadequate signal;
- averaging, in the retry mode, multiple signals to improve interpretation of the input signal including:
- obtaining a second signal representing same data as the input signal, averaging the input signal and the second signal to produce an averaged signal and to improve signal interpretation;
- interpreting the averaged signal, and
- determining whether the discrete values are adequately indicated based on the averaged signal

(Note: Claim 11 in Rothberg)

14. Claims 23, 35, 46, 54 and 65 are rejected for the same reasons as per claim 2.

Art Unit: 2112

15. Claims 34 and 45, 64 are rejected for the same reasons as per claim 22.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
16. Claims 3-8, 13-18, 25,27,29,36-42, 47-49,51,55-60,67,69 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rothberg as applied to claim 1 above, and further in view of Takashi et al. US patent no. 6519715 (Hereinafter Takashi).
17. In regard to claim 3, Rothberg teaches substantially all the limitations in claim 1. However, Rothberg does not teach:
- (previously presented) The apparatus of claim 1, wherein the signal from the input comprises an analog signal, the apparatus further

comprising a filter and an analog-to-digital converter (ADC) coupled between the input and the detector.

Takashi, in an analogous art that teaches improved reliability of the data recovery processing and data recording from storage medium teaches:

- (previously presented) The apparatus of claim 1, wherein the signal from the input comprises an analog signal, the apparatus further comprising a filter and an analog-to-digital converter (ADC) coupled between the input and the detector.

(Note; Figure 1, reference characters (1), (3) and (4) in Takashi)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Takashi that comprises a filter and an analog-to-digital converter (ADC) coupled between the input and the detector with the teaching of Rothberg.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the need for improved reliability of the data recovery processing and data recording from storage medium teaches.

19. In regard to claim 4, Takashi teaches:

(original) The apparatus of claim 3, wherein the buffer is coupled between the ADC and the filter.

(Note: FIG. 2, reference character (6) in Takashi)

20. In regard to claim 5, Takashi teaches:

(original) The apparatus of claim 3, wherein the buffer is coupled between the filter and the detector.

(Note: FIG. 2, reference character (6) in Takashi)

21. In regard to claim 6, Takashi teaches:

(original) The apparatus of claim 3, wherein the filter comprises a finite impulse response (FIR) digital filter coupled between the ADC and the detector.

(Note: col. 8, line 42 in Takashi)

22. In regard to claim 7, Takashi teaches:

(original) The apparatus of claim 1, further comprising an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which signals are averaged.

(Note: FIG. 35, reference character (13) in Takashi)

23. In regard to claim 8, Takashi teaches:

(original) The apparatus of claim 1, wherein the detector comprises a Viterbi detector.

(Note: FIG. 35, reference character (13) in Takashi)

24. Claim 13, 38, 47 and 55 are rejected for the same reasons as per claim 3.

25. Claims 14, 36, 39 and 56 are rejected for the same reasons as per claim 4.

26. Claims 15, 40 and 57 are rejected for the same reasons as per claim 5.

27. Claims 16, 25, 48, 58 and 67 are rejected for the same reasons as per claim 6.

28. Claims 17, 42 and 59 are rejected for the same reasons as per claim 7.

Art Unit: 2112

29. Claims 18, 27, 29, 41, 49, 51, 60, 69 and 71 are rejected for the same reasons as per claim 8.
30. Claim 37 is rejected for the same reasons as per claim 11.

Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Vallis US patent no. 7050252 teaches disk drive employing off-line sector verification and relocation of marginal sectors discovered during read error recovery procedure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2112

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on (571) 272-6962. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free)

Sam Rizk,

Examiner

ART UNIT 2112

SR
6/13/07

Jacques Louis-Jacques
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100